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Nº 38

RESEARCH AID

1955 RUBLE-DOLLAR RATIOS
FOR PRICES OF
SOVIET AND US METALCUTTING MACHINE TOOLS



CIA/RR RA-32

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FOREWORD

This research aid presents 1955 ruble-dollar ratios for prices of Soviet and US metalcutting machine tools as aids to analysts who have occasion to make ruble-dollar conversions at the actual prices prevailing in 1955 rather than at the officially fixed exchange rate of 4 rubles to 1 US dollar. In this respect the research aid supplements a previous research aid (CIA/RR RA-9, Ruble-Dollar Ratios for Prices of Machine Tools, Metalforming Machinery, Textile Machinery, and Abrasive Products, 10 October 1956, CONFIDENTIAL), which contained 1950 ruble-dollar ratios for prices of metalcutting machine tools.

In addition to providing a more recent benchmark year for comparing prices of metalcutting machine tools in Soviet rubles and US dollars, this research aid calls attention to the significant change which occurred during 1950-55 in the ratio of these prices. The presentation of the 1955 ruble-dollar ratios for prices of metalcutting machine tools reflects certain advances in comparison with the presentation of the 1950 ratios. Most notably the recent publication of Soviet data on production has made possible for the first time a binary comparison of ruble-dollar price ratios using, as the weights, physical units of machine tools produced during 1955 in the US and the USSR.

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1955 RUBLE-DOLLAR RATIOS
FOR PRICES OF SOVIET AND US METALCUTTING MACHINE TOOLS*

Summary

Of the several unweighted and weighted ruble-dollar ratios derived in this research aid from 1955 prices of metalcutting machine tools produced in the US and the USSR, the unweighted arithmetic average ruble-dollar ratio of 1.7 rubles to 1 US dollar** is believed to be as valid a single ruble-dollar ratio for 1955 as can be derived from the sample at hand. The nearest comparable US machine tools are, however, in most cases, more advanced technologically than their Soviet counterparts. This ratio falls midway between the binary ruble-dollar ratios of 1.3 to 1, derived when the sample is weighted by physical units of production in the USSR, and 2.1 to 1, derived when the sample is weighted by physical units of production in the US.

A comparison between a previously derived 1950 ruble-dollar ratio of 4.4 to 1 1/*** and the 1955 ratio of 1.7 to 1 indicates that a significant change has occurred in the prices of Soviet and US metalcutting machine tools. Unquestionably the major factor in the low ratio for 1955 compared with that for 1950 was the ability of the USSR to reduce the prices on standardized machine tools during a period when the prices of machine tools produced in the US were rising.

One significant exception in the sample is the high ruble-dollar ratio of 5.6 to 1 derived in comparing a US boring mill with a new Soviet model of a boring mill which could be sold competitively on the world market. In addition to raising the average 1955 ruble-dollar ratio for prices of metalcutting machine tools, this ratio is important in that it reflects the influence of the high initial price at which new Soviet machine tools often are introduced to absorb the full cost of development and tooling for production. Consequently, the ruble-dollar ratio for boring mills may reflect somewhat more accurately than do the ruble-dollar ratios for the other machine tools in the sample the relationship between the 1955 prices of new Soviet machine tools which could be offered competitively in the world market and comparable US machine tools.

* The estimates and conclusions contained in this research aid represent the best judgment of ORR as of 1 March 1958.

** Ruble values are given in 1955 rubles and dollar values in 1955 US dollars throughout this research aid.

*** For serially numbered source references, see Appendix E.

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The change during 1950-55 in the ruble-dollar ratio for prices of metalcutting machine tools should be considered in comparison with the changes which occurred during this same period in the complex price structures of the two different, and sometimes incomparable, economic systems. Because of the difference in price structures, the change in ruble-dollar ratios is not necessarily a gauge of changes in production efficiency in the respective countries.

I. Formulation and Interpretation.

A. Statistical Data.

Although the same general problems that were outlined in source 2/ remain basic in formulating and interpreting representative ruble-dollar ratios at any period, the data available for US and Soviet metalcutting machine tools in 1955 mark a certain advance in comparison with the data available for 1950.

For example, the recent publication of statistics on production of metalcutting machine tools in the USSR, although not all that might be desired, made it possible for the first time to see the effect of weighting the sample of metalcutting machine tools by the Soviet production mix as well as by the US production mix. These same statistics, together with statistics on US production of machine tools published by the US Department of Commerce in its series Facts for Industry, made possible the selection of the 1955 samples not only on the basis of comparability of individual machine tools but also on the basis of the homogeneity of the categories of machine tools* from which the sample was drawn and by which the sample was weighted in making binary comparisons.

Success in obtaining direct 1955 prices of the US metalcutting machine tools in the sample for comparison with the prices of 1 July 1955 for the Soviet metalcutting machine tools eliminated the necessity of adjusting US prices of a later year to the benchmark year, as was necessary in formulating the 1950 ratios.

* For specifications of US and Soviet metalcutting machine tools selected as samples for this research aid, see Appendix C.

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B. Changes in the Structure of Prices in the US and the USSR
During 1950-55.

In contrast to the improved availability of data for the 1955 ruble-dollar ratios for prices of metalcutting machine tools, the changes which occurred in the price structure of the economies of the US and the USSR during 1950-55 make it somewhat more difficult to assess the validity of the 1955 ratio, particularly as an indicator of changes which may have occurred in the relative productional efficiency of the two countries. For example, the marked reductions in the prices of series-produced Soviet metalcutting machine tools which took place between 1 January 1950 and 1 July 1955 most certainly were tied to improvements in productional efficiency, notably increased labor productivity. Meanwhile, improvements in productional efficiency in the US, including gains in labor productivity, were obscured somewhat by the growing costs of production. Thus it is clear that the nominal prices of the machine tools in 1955 do not reflect accurately the dynamics of productional efficiency in the respective economies, mainly because of differences in the price structure.

II. Analysis.

A sample of nine ruble-dollar ratios based on the 1955 prices of comparable metalcutting machine tools produced in the US and the USSR yields the following unweighted and weighted average ratios:

Type of Ratio	1955 Ruble-Dollar Ratio
Unweighted arithmetic average of sample	1.7 to 1
Unweighted median average of sample	1.2 to 1
Sample weighted by value of US production in 1955 (System I)*	2.4 to 1
Sample weighted by units of US production in 1955, including lathes (System II)	1.6 to 1
Sample weighted by units of US production in 1955, excluding lathes (System IIa)	2.1 to 1
Sample weighted by units of Soviet production in 1955 (System III)	1.3 to 1

* For a discussion of Systems (of weighting) I, II, IIa, and III, see the text below and Appendix B.

C-O-N-F-I-D-E-N-T-I-A-L

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The unweighted average ratios in the tabulation above were computed as shown in Table 1,* and the weighted ratios as shown in Table 2,** which is based on data in Table 3.***

An earlier sample of 22 ruble-dollar ratios based on 1950 prices of comparable metalcutting machine tools produced in the US and the USSR yielded the following average ratios 3/:

Type of Ratio	1950 Ruble-Dollar Ratio
Unweighted arithmetic average of sample	4.4 to 1
Unweighted median average of sample	4.1 to 1
Sample weighted by value of US production in 1947	4.5 to 1

Subject to limitations of accuracy in the sampling and weighting techniques, it is apparent that in 1955 the USSR showed a markedly more favorable position in comparison with the US in the prices of its metalcutting machine tools than in 1950, when the ratio approximated the official exchange rate of 4 rubles to 1 dollar.

It is believed that the unweighted arithmetic average ruble-dollar ratio of 1.7 to 1 is as valid a single ruble-dollar ratio for 1955 as can be derived from this sample, falling as it does about midway between the binary ruble-dollar ratios of 1.3 to 1, derived when the sample is weighted by physical units of production in the USSR (System III), and 2.1 to 1, derived when the sample is weighted by physical units of production in the US (System IIa). Because there is no basis for comparing the ruble-dollar ratio of 2.4 to 1 (System I), which is a ratio derived when the sample is weighted according to value of production in the US, with a similar ratio weighted according to value of production in the USSR and because the inclusion of numerous light types of US lathes in the ruble-dollar ratio of 1.6 to 1 (System II) introduces an unjustifiable bias, these ratios are considered of secondary importance in the derivation of a representative 1955 ruble-dollar ratio for prices of US and Soviet metalcutting machine tools.

To some degree the average ruble-dollar ratio's being lower in 1955 compared with the average ratio in 1950 may be caused by the sample. Except for boring mills, for which the ratio in both 1950 and

* Table 1 follows on p. 7.

** Table 2 follows on p. 9.

*** Appendix B, p. 14, below.

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1955 was approximately 5.6 to 1, the categories selected for the 1955 sample* happen to be principally those which had ratios lower than the average ratio in 1950. The concentration of the ruble-dollar ratios of individual categories (except the ratio for boring mills) between 1.0 to 1 and 1.6 to 1 in the 1955 sample, however, marks a significant change from 1950, when the lowest such ratio was 2.7 to 1. Unquestionably the major factor in the low ratios for 1955 was the ability of the USSR to reduce the prices on standardized machine tools during a period when the prices of machine tools produced in the US were rising.

Although it is possible to speak of certain US and Soviet machine tools as being comparable, such machine tools would not necessarily be competitive in the world market, because many of the mass-produced Soviet machine tools lack the refinements that US machine tools possess. However, for the planned domestic market within the USSR, which has absorbed the bulk of the standardized single-purpose machine tools produced within the USSR, there has been no "competition" from the US; and the Soviet machine tools apparently have filled Soviet requirements.

In the case of the relatively high ruble-dollar ratio for boring mills, however, there is evident the high initial price at which new Soviet machine tools often are introduced, and this high initial price has important implications for possible future ruble-dollar ratios as well as for its effect on the various weighted 1955 ruble-dollar ratios. New Soviet machine tools often are introduced at a high initial price to absorb the full cost of development and tooling for production. This high initial price temporarily may place the USSR in a less favorable position compared with the US, in which the initial price of a new model of a general-purpose machine tool is often less than the initial cost of production, as the result of a competitive market and of planned long-term recovery of expenditures incurred in introducing the new model.

The Soviet boring mill selected for the 1955 sample was a new machine tool which could be sold competitively on the world market. Consequently, the ruble-dollar ratio for boring mills may reflect somewhat more accurately than do the ruble-dollar ratios for the other machine tools in the sample the relationship between the 1955 prices of new Soviet machine tools which could be offered competitively in the world market and comparable US machine tools.

* For the basis for selecting the 1955 sample and for other methodology, see Appendix A.

C-O-N-F-I-D-E-N-T-I-A-L

C-O-N-F-I-D-E-N-T-I-A-L

The change in the 1955 ruble-dollar ratio for metalcutting machine tools (1.7 to 1) compared with the 1950 ruble-dollar ratio (4.4 to 1) should be viewed in comparison with changes which occurred during 1950-55 in the complex price structures of the two different, and sometimes not comparable, economic systems. The change in ruble-dollar ratios is not necessarily a gauge of changes in productional efficiency in the respective countries, because of the difference in price structures.

C-O-N-F-I-D-E-N-T-I-A-L

Table 1
Unweighted Ruble-Dollar Ratios
for Prices of US and Soviet Metalcutting Machine Tools a/*
1955

Type of Machine Tool	US		Soviet	
	Price per Unit		Price per Unit b/	
	Model	US \$	Model	(Rubles)
Boring machines				
Boring machine, horizontal	Giddings and Lewis, 350HT Lucas, 542B120	60,020 } 53,490 }	2630	316,950
Drilling machines				
Drilling machine, radial	Carlton, 1A Cincinnati Gilbert, 5 feet by 11 inches	10,650 } 11,230 }	255	17,600
Gear-cutting machines				
Gear-slotting machine	Fellows, 645A	15,140	514	18,500
Lathes				
Lathe, screw-cutting	Springfield, Series 280	7,727	1A62	9,700
Lathe, screw-cutting	Le Blond, MD Monarch, Series 60	12,780 } 10,750 }	1D63A	14,150
Turret lathes				
Lathe, turret	Warner and Swasey, 1A	17,860 }	1K36	16,520
Lathe, turret	Bardons and Oliver, 21A Warner and Swasey, 2A	15,140 } 21,340 }	1K37	20,360

* Footnotes for Table 1 follow on p. 8.

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 Table 1
 Unweighted Ruble-Dollar Ratios
 for Prices of US and Soviet Metalcutting Machine Tools ^{a/}
 1955
 (Continued)

Type of Machine Tool	US		Soviet	
	Model	Price per Unit US \$	Average Price per Unit	Model
				Price per Unit ^{b/} (Rubles)
Automatic and semiautomatic lathes				Unweighted Ratio
Lathe, 6-spindle automatic chucking	New Britain, 61	32,000		1261M
Shapers				41,600
Shaping machine, vertical (slotter)	Pratt and Whitney, 6B	9,880		7417
Arithmetic average				11,800
Median average				
a. Prices of Soviet and US machines in this table are the prices quoted for the machines when sold with standard equipment.				
b. ^{4/}				

Table 2
Weighted Ruble-Dollar Ratios for Prices
of US and Soviet Metalcutting Machine Tools
1955

Type of Machine Tool	Unweighted Ratio $\frac{a}{b}$ *	Weights (Percentage)				Weighted Ratios $\frac{c}{d}$		
		System I, b/ US Production (Value)	System II, b/ US Production c/ (Units)	System IIA, b/ US Production d/ (Units)	System III, b/ Soviet Production (Units)	System I	System II	System IIA System III
Boring machines	5.6 to 1	28	9	19	1	156.8 to 28	50.4 to 9	106.4 to 19 5.6 to 1
Boring machine, horizontal	5.6 to 1							
Radial drilling machines	1.6 to 1	4	4	9	5	6.4 to 4	6.4 to 4	14.4 to 9 8.0 to 5
Drilling machine, radial	1.6 to 1							
Gear-cutting and gear-finishing machines	1.2 to 1	13	8	16	4	15.6 to 13	9.6 to 8	19.2 to 16 4.8 to 4
Gear shaper (slotting machine)	1.2 to 1							
Lathes	1.2 to 1	19	51		71	22.8 to 19	61.2 to 51	85.2 to 71
Lathe, screw-cutting	1.3 to 1							
Lathe, screw-cutting	1.2 to 1							
Turret lathes	1.0 to 1	9	10	21	6	9.0 to 9	10.0 to 10	21.0 to 21 6.0 to 6
Lathe, turret	1.0 to 1							
Lathe, turret	1.0 to 1							

* Footnotes for Table 2 follow on p. 10.

Table 2
Weighted Ruble-Dollar Ratios for Prices
of US and Soviet Metalcutting Machine Tools
1955
(Continued)

Type of Machine Tool	Unweighted Ratio a/	Weights (Percentage)				Weighted Ratios: c/		
		System I, b/ US Production (Value)	System II, b/ US Production (Units)	System IIa, b/ US Production d/ (Units)	System III, b/ Soviet Production (Units)	System I	System II	System III
Automatic and semiautomatic lathes	1.3 to 1	26	15	30	3	33.8 to 26	19.5 to 15	39.0 to 30
Lathe, 6-spindle automatic chucking	1.3 to 1							
Shapers	1.2 to 1	2	3	6	9	2.4 to 2	3.6 to 3	7.2 to 6
Shaping machine, vertical (slotter)	1.2 to 1							
Total		101 f/	100	101 f/	99 f/	246.8 to 101	160.7 to 100	207.2 to 101
Weighted ratio						2.4 to 1	1.6 to 1	2.1 to 1
								124.3 to 99
								1.3 to 1

1. Taken from Table 1, p. 7, above. Where there was more than one ratio for a category, a single ruble-dollar ratio was derived by taking the arithmetic average of all ratios within the category.

2. For a further explanation of Systems (of weighting) I, II, IIa, and III, see Appendix B.

3. Including lathes.

4. Excluding lathes.

5. Ruble-dollar ratios for each category multiplied by corresponding weights.

6. Because of the rounding of subtotals, this total does not equal 100.

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APPENDIX A

METHODOLOGY

The sample for the 1955 ruble-dollar ratios for prices of metal-cutting machine tools was selected, to the extent that information was available, to represent major types of machine tools produced in the US and the USSR. The majority of the machine tools in the sample, both US and Soviet, have been in production over a period of years. The categories of machine tools represented -- boring machines, drilling machines, gear-cutting machines, several types of lathes, and shapers -- comprise about half of the categories of machine tools produced in each of the two countries. In terms of value, these categories comprised about 40 percent of US production of machine tools in 1955, and in terms of physical units they comprised nearly 40 percent of Soviet production of machine tools in 1955 (see the footnotes in Table 3*). Furthermore, except for screw-cutting (engine) lathes, it is believed that in each of the two countries the machine tools reported under these categories are homogeneously comparable and therefore lend themselves to weighting by data on both US and Soviet production. (Figures on some categories of US production such as engine lathes, drilling machines, grinding and polishing machines, and milling machines include light types of machine tools not believed to be included under these categories in the Soviet breakdown of production of machine tools. Soviet figures on production, however, include the categories "special, specialized, and unit-type machine tools" and "other machine tools," the composition of which is not fully explained.)

The reasons for selecting a particular sample differ from machine to machine. In some cases the Soviet model selected to represent a category is considered representative in terms of large-series production (the 1A62 lathe) or of price (the 514 gear-cutting machine and the 7417 shaping machine). In other cases the Soviet model is a copy of the US model or of the forerunner of the US model with which it is being compared -- for example, the 1K36 and 1K37 turret lathes. The 2630 boring mill was selected for the following two reasons: first, in 1955 the older model boring mills were becoming obsolete and, second, a Soviet machine tool which only recently had come into production and which could be sold in competition with foreign models of boring mills on the world market well illustrates the effect of the high initial price of new Soviet machine tools when international comparisons are made.

* Appendix B, p. 14, below.

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Some of the US machine tools were selected because they were the models from which the Soviet machine tools selected for the sample were copied directly. In other cases, US models which were believed to approximate most closely the Soviet machine tool on the basis of specifications, level of technology, and function were selected. In some cases an average was struck between two US machine tools to make a more accurate comparison with a Soviet machine tool.

The respective prices of the US and Soviet models were put into the form of ruble-dollar ratios by dividing the dollar prices of the US machines into the ruble prices of the Soviet machines. The individual unweighted ruble-dollar ratios shown in Table 1* were then arrayed and added to find the unweighted median average and the unweighted arithmetic average respectively.

In Table 2** the sample ruble-dollar ratios were weighted according to the four alternative weighting systems laid out in Table 3.*** In each of the four cases, by equating to 100 percent the US and Soviet figures for absolute production in the categories of machine tools selected as a sample, systems of proportions expressed as percentages were developed for weighting each category of ruble-dollar ratio. The purpose of Table 2 is to illustrate the effect of weighting the ratios according to varying systems which represent the differences both between the US and Soviet patterns of production for machine tools and, in the case of the US, between varying methods of computing data on production (value versus physical units of production).

* P. 7, above.

** P. 9, above.

*** Appendix B, p. 14, below.

C-O-N-F-I-D-E-N-T-I-A-L

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APPENDIX B

1955 WEIGHTS USED TO WEIGHT RUBLE-DOLLAR RATIOS
FOR PRICES OF US AND SOVIET METALCUTTING MACHINE TOOLS

The data on production in Table 3* have been selected from official US and Soviet publications dealing with production in 1955 of metal-cutting machine tools in the two respective countries to weight the ruble-dollar ratios developed for individual samples and shown in Table 2.** Of the metalcutting machine tools selected for comparison, it was necessary in the weighted sample to include those types of machine tools for which data on US and Soviet production were considered to be reported on a comparable basis. Because data from the US Department of Commerce on physical production of lathes are believed to be inflated by the inclusion of many more light industrial types than are the Soviet data on lathes, weighting System IIA was adopted to see how the arithmetic average weighted ratio would be affected by omitting the weighted ratio for lathes. Moreover, because slotting machines are included under the category of shapers in figures from the US Department of Commerce on US production of metalcutting machine tools, Soviet figures on production of shapers and slotters were added together to make the US and Soviet weights homogeneous for this sample.

The statistics on production of US and Soviet metalcutting machine tools from which the data in Table 3* were abstracted are cited as source references in Table 3. Caution is required in working with these statistics, however, because of methodological problems relating to their composition and compilation.

* Table 3 follows on p. 14.

** P. 9, above.

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Table 3

Alternative Systems of Weighting 1955 Ruble-Dollar Ratios
for Prices of US and Soviet Metalcutting Machine Tools
1955

Type of Machine Tool	US Production ^{a/}			Soviet Production ^{b/}		
	System I, \$/Value		System II, \$/Quantity		System III, \$/Quantity	
	Thousand US \$	Percentage	Units	Percentage	Units	Percentage
Boring machines	77,372	28	2,122	9	643	1
Radial drilling machines	10,692	4	1,014	4	2,000	5
Gear-cutting machines	36,565	13	1,749	8	1,973	4
Lathes	53,961	19	11,567	51	31,292	71
Turret lathes	25,234	9	2,311	10	2,825	6
Automatic and semiautomatic lathes	71,734	26	3,312	15	1,524	3
Shapers	4,646	2	703	3	4,064	9
Total	280,204 ^{d/}	101 ^{e/}	22,778 ^{f/}	100	44,321 ^{g/}	22 ^{e/}

a. ^{5/}
b. ^{6/}

c. For a further explanation of Systems (of weighting) I, II, III, and IV, see Appendix B.
d. This total is approximately 41 percent of the value of total production, 1955 US \$688,178,000, reported by the US Department of Commerce. Addition of the subtotals from the Department of Commerce, however, totals only 1955 US \$668,178,000, which is close to the value of production of 1955 US \$670,400,000 estimated for 1955 by the National Machine Tool Builders Association. The estimate of the National Machine Tool Builders Association contains no subtotals for the different categories of machine tools.
e. Because of the rounding of subtotals, this total does not equal 100.
f. No total number of units for 1955 production of metalcutting machine tools in physical units is available. An unofficial tally of the subtotals for which figures on production are given by the US Department of Commerce shows that 106,451 machine tools were reported to have been produced. This unofficial tally is exclusive of the category "drilling machines" and the residual category "all other machine tools." Because light types of machine tools are included in these figures from the US Department of Commerce, care must be exercised in comparing unit production in some categories, such as lathes, with the corresponding Soviet category on an equivalent basis. For this reason, the system of weighting based on US production in 1955, in physical units, is presented alternatively with lathes (System II) and without lathes (System IIIa). This example illustrates the radical effect which the composition of weighting systems can exercise on ruble-dollar ratios (see Table 2, p. 9, above).
g. This total is approximately 38 percent of the total Soviet unit production of 117,087 metalcutting machine tools in 1955. Unfortunately, the exact composition of these categories has not been stated explicitly with respect to heavy and light types.

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APPENDIX C

SPECIFICATIONS OF US AND SOVIET METALCUTTING MACHINE TOOLS
SELECTED AS SAMPLES FOR 1955 RUBLE-DOLLAR RATIOS

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US		Soviet	
Type of Machine Tool	Model	Model	Specifications
Boring machines			
Boring machine, horizontal	Giddings and Lewis, 350FT	2630	Diameter of spindle: 125 millimeters (mm) (5 in) Working surface of table: 1,250 by 1,600 mm (50 by 64 in) Range of spindle speed: 7.5 to 975 revolutions per minute (rpm) (45 speeds) Capacity of main electric motor: 25 horsepower (hp) Weight: 45,600 pounds (lbs)
	Lucas, 542B120		Diameter of spindle: 5 in Working surface of table: 40 by 110 in Range of spindle speed: 9 to 1,200 rpm (26 speeds) Capacity of main electric motor: 20 hp Weight: 48,000 lbs
Drilling machines			
Drilling machine, radial	Carlton, 1A	255	Arm: 1,500 mm (5 ft) Column: 35 mm (1 1/4 in) Range of spindle speed: 30 to 1,700 rpm (12 speeds) Capacity of main electric motor: 4.5 kw (6 hp) Weight: 4.2 tons (9,200 lbs)
	Cincinnati Gilbert		Arm: 5 ft Column: 11 in Range of spindle speed: 50 to 1,800 rpm (12 speeds) Capacity of main electric motor: 7.5 hp Weight: 9,400 lbs

* Tonnages are given in metric tons throughout this appendix unless otherwise indicated.

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US		Soviet		
Type of Machine Tool	Model	Specifications	Model	Specifications
Gear-cutting machines				
Gear-slotting machine	Fellows, 645A	Gear diameter: 18-in pitch diameter Diametral pitch: .75-in spur; .71-in helical Strokes: 50 to 300 strokes per minute (8 speeds) Face width (external to internal): 5 to 3 in Capacity of main electric motor: 3 hp Weight: 7,200 lbs	514	Gear diameter: 20 to 500 mm (.8 to 20 in) Module: 2 to 6 mm Strokes: 125 to 359 strokes per minute (4 speeds) Face width (external to internal): 105 to 75 mm (4.2 to 3 in) Capacity of main electric motor: 2.8 kw (3.7 hp) Weight: 3.5 tons (7,700 lbs)
Lathes				
Lathe, screw-cutting	Springfield, Series 280	Outside diameter of work piece: 16 in Distance between centers: 54 in Range of spindle speed: 18 to 1,200 rpm (16 speeds) Capacity of main electric motor: 10 hp Weight: 5,910 lbs	1A62	Outside diameter of work piece: 400 mm (16 in) Distance between centers: 1,500 mm (60 in) Range of spindle speed: 11.5 to 1,200 rpm (24 speeds) Capacity of main electric motor: 7 kw (10 hp) Weight: 2.37 tons (5,200 lbs)
Lathe, screw-cutting	Le Blond, MD	Outside diameter of work piece: 22.5 in Distance between centers: 60 in Range of spindle speed: 16 to 1,010 rpm (24 speeds) Capacity of main electric motor: 15 hp Weight: 6,900 lbs	1D63A	Outside diameter of work piece: 615 mm (24.6 in) Distance between centers: 1,500 mm (60 in) Range of spindle speed: 14 to 750 rpm (18 speeds) Capacity of main electric motor: 10 kw (14 hp) Weight: 3.33 tons (7,300 lbs)
	Monarch, Series 60	Outside diameter of work piece: 22.5 in Distance between centers: 60 in Range of spindle speed: 17 to 700 rpm (16 speeds) Capacity of main electric motor: 15 hp Weight: 7,110 lbs		

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Type of Machine Tool	US		Soviet	
	Model	Specifications	Model	Specifications
Lathes (Continued)				
Lathe, turret	Warner and Swasey, 1A	Maximum diameter of bar: 2.5 in Maximum swing: 18 in Range of spindle speed: 40 to 916 rpm (12 speeds) Capacity of main electric motor: 15 hp Weight: 5,850 lbs	LK36	Maximum diameter of bar: 65 mm (2.6 in) Maximum swing: 440 mm (17.6 in) Range of spindle speed: 44 to 1,000 rpm Capacity of main electric motor: 10 kw (14 hp) Weight: 2.87 tons (6,300 lbs)
	Bardons and Oliver, 21A	Maximum diameter of bar: 2.5 in Maximum swing: 21.25 in Range of spindle speed: 28 to 743 rpm (12 speeds) Capacity of main electric motor: 10 hp Weight: 6,050 lbs		
Lathe, turret	Warner and Swasey, 2A	Maximum diameter of bar: 3.5 in Maximum swing: 21.5 in Range of spindle speed: 34 to 920 rpm (12 speeds) Capacity of main electric motor: 20 hp Weight: 7,250 lbs	LK37	Maximum diameter of bar: 85 mm (3.4 in) Maximum swing: 550 mm (22 in) Range of spindle speed: 29 to 800 rpm Capacity of main electric motor: 14 kw (18.5 hp) Weight: 3.65 tons (8,000 lbs)
Lathe, 6-spindle automatic chucking	New Britain, 61	Maximum diameter of bar: 2.25 in Maximum length of bar stock: 6 in Range of spindle speed: 118 to 1,675 rpm Capacity of main electric motor: 20 hp Weight: 14,925 lbs	1261M	Maximum diameter of bar: 50 mm (2 in) Maximum length of bar stock: 160 mm (6.4 in) Range of spindle speed: 88 to 1,015 rpm Capacity of main electric motor: 14 kw (18.5 hp) Weight: 7 tons (15,500 lbs)
Shapers				
Shaping machine, vertical (slotter)	Pratt and Whitney, 6B, M-1506	Maximum stroke: 6 in Diameter of table: 19.7 in Table travel: 25 by 20 in Ram strokes: 33 to 116 strokes per minute (4 speeds) Capacity of main electric motor: 3 hp Weight: 4,600 lbs	7417	Maximum stroke: 160 mm (6.4 in) Diameter of table: 500 mm (20 in) Table travel: 500 by 510 mm (20 by 20.4 in) Ram strokes: 30 to 120 strokes per minute (4 speeds) Capacity of main electric motor: 2.8 kw (3.7 hp) Weight: 2.27 tons (5,000 lbs)

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APPENDIX D

GAPS IN INTELLIGENCE

The major gap in intelligence with respect to formulating a representative 1955 ruble-dollar ratio for prices of Soviet and US metal-cutting machine tools is the lack of data on the Soviet product mix expressed in terms of value. Such data are necessary for binary ruble-dollar ratios weighted by the value of production in the respective countries. Binary ruble-dollar ratios weighted by value of production probably would provide a more valid measure for international comparisons than do the binary ruble-dollar ratios weighted by physical units of production which are presented in this research aid. Given data on both value and quantity of production of each category of machine tool in the US and the USSR, it would be possible to check the price of the model selected to represent each category against an average unit price derived by dividing the total number of units of that category into the total value.

It is still difficult to obtain prices of US machine tools. In addition, because of the confidential nature which many US machine tool manufacturers attach to their data on production and prices, the US figures compiled by the Department of Commerce must be treated with some caution. Sometimes data are "buried" in categories -- for example, when it is stated that certain machines are "included with 'all other grinding machines' to avoid disclosing figures of individual companies." 7/ More detailed information on the precise composition of the various categories of metalcutting machine tools reported to be produced in the respective countries is highly desirable in order to improve the weighted ruble-dollar ratios.

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APPENDIX E

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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1. CIA. CIA/RR RA-9, Ruble-Dollar Ratios for Prices of Machine Tools, Metalforming Machinery, Textile Machinery, and Abrasive Products, 10 Oct 56, p. 6. C. Eval. RR 2.
 2. Ibid., p. 2-4. C. Eval. RR 2.
 3. Ibid., p. 6. C. Eval. RR 2.
 4. USSR, Ministry of Finance. Spravochnik tsen na stroitel'nyye materialy i oborudovaniye, deystvuyushchikh s 1 iyulya 1955 g (Handbook of Prices for Construction Materials and Equipment, Effective 1 July 1955), Moscow, 1956, pt 2, p. 55-93. U. Eval. Doc.

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5. Commerce, Bureau of the Census. Facts for Industry, 3 May 57, p. 4-9. U. Eval. RR 2.
6. CIA. FDD Translation no 647, Jul 57, USSR Industry, a Statistical Compilation, p. 208-209. OFF USE. Eval. RR 2.
7. Commerce, Bureau of the Census. Facts for Industry, 3 May 57, p. 7. U. Eval. RR 2.

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